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By

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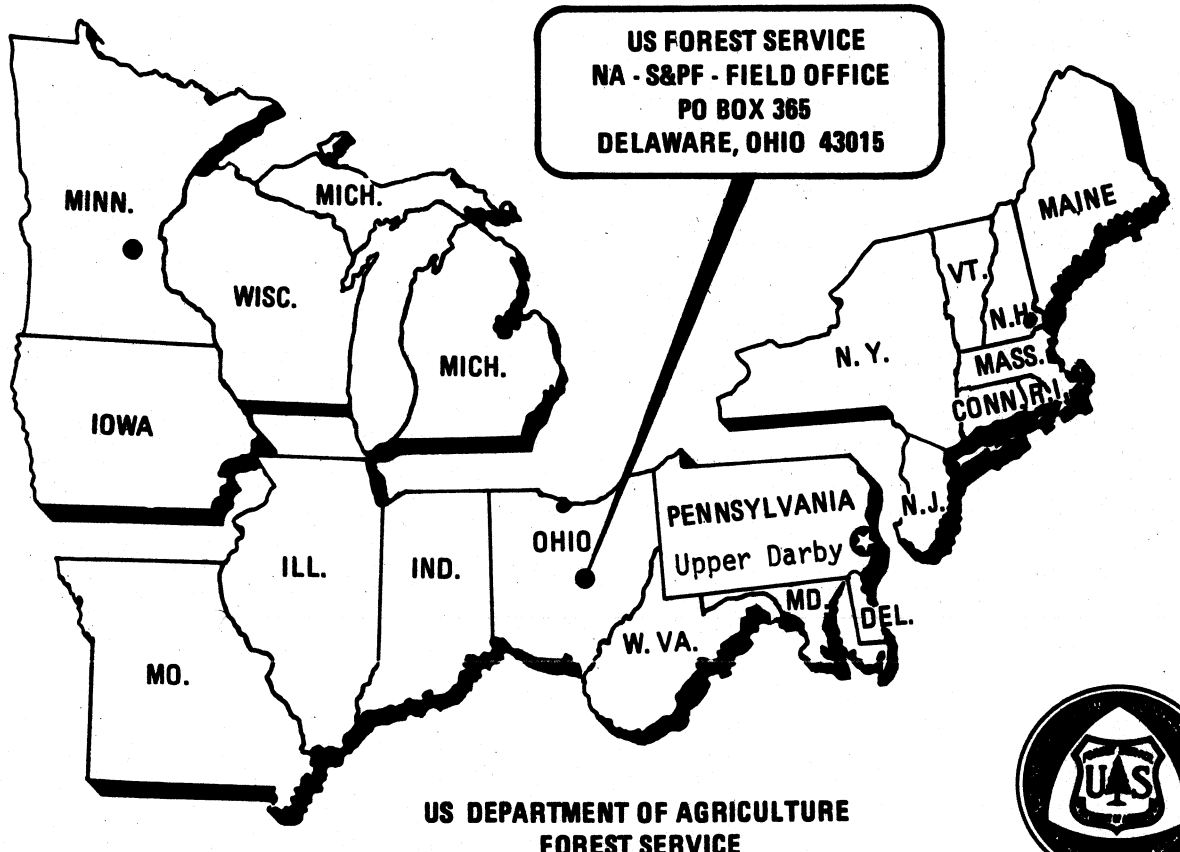

US DEPARTMENT OF AGRICULTURE
FOREST SERVICE

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ABSTRACT

Aerial surveys of 15,000 square miles of southeastern Missouri were made in the summer of 1970 in cooperation with state personnel to estimate the incidence of oak wilt-caused mortality. Incidence of oak wilt was estimated at 0.92 tree per square mile. The peak period was judged to be the first half of July. Results of visual and photographic observations were similar in terms of infected trees found.

INTRODUCTION

Oak wilt, a disease caused by *Ceratocystis fagacearum* (Bretz) Hunt, has been known to occur in the 20-state Northeastern Area for at least 30 years (Bretz 1951). In this area Pennsylvania and West Virginia have been conducting annual surveys for this disease as an integral part of their cooperatively financed control programs. Information on the incidence of oak wilt is needed periodically in other states to evaluate the status of the disease in the absence of control programs.

This evaluation was designed to estimate the effect of the disease on oak types in Missouri. Aerial photography was compared with aerial sketch-mapping, the most frequently used method of obtaining oak wilt mortality figures.

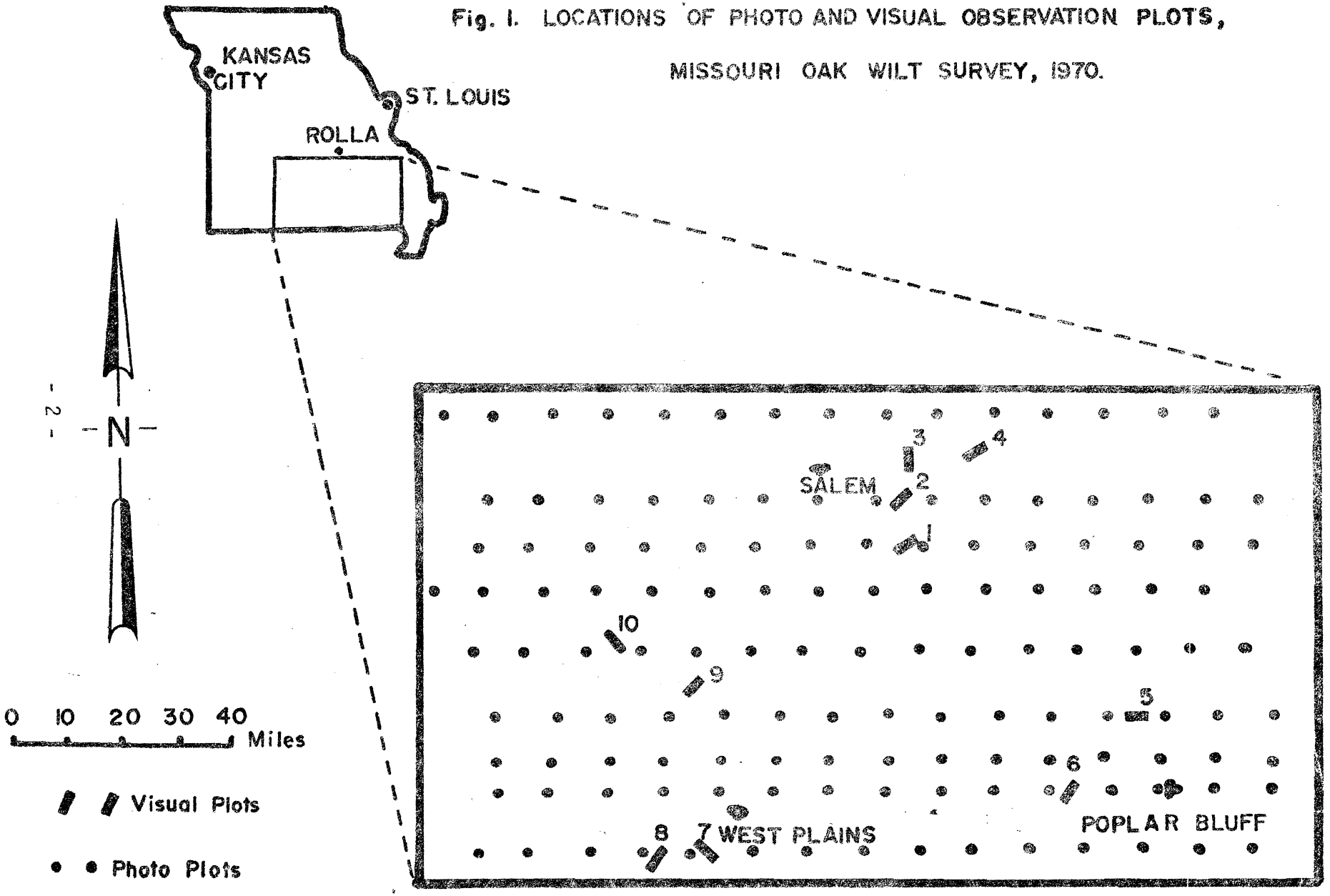
METHODS

The investigation was conducted in three phases:

(1) Visual surveys of observation plots - Periodic visual aerial surveys were used to determine seasonal and periodic oak wilt incidence and to fix the peak oak wilt period for future surveys. Ten rectangular plots (5 x 0.6 miles) were chosen to receive visual observation during the weeks of June 23, July 6, July 20, and August 3 (Fig. 1).1/ Four plots on the Salem District of the Clark National Forest were chosen to include known oak wilt infested spots, and six were chosen at random in the survey area. The plots were observed from a 3-passenger Cessna, and suspect trees were marked on U.S.G.S. topographic maps.

1/ Missouri Department of Conservation furnished airplane and pilot for the first survey.

Fig. 1. LOCATIONS OF PHOTO AND VISUAL OBSERVATION PLOTS, MISSOURI OAK WILT SURVEY, 1970.



(2) Photography of visual observation plots - An aerial photographic survey of a portion of the plots was made to compare photographic and visual methods of detecting oak wilt. Four plots in the Salem District (Plots 1-4 on Fig. 1) were photographed on July 7, the same date as one of the visual surveys. A scale of 1:4000 was used with Ektachrome MS 2448 color film, 9" x 9" format. Interpretation was made with an Old Delft stereoscope and the suspect trees were marked on the photographs. Ground checks of visual and photographic interpretation were made by different crews.

(3) Aerial photographic sampling survey - This phase of the evaluation was undertaken to obtain a sample of oak wilt-caused mortality in southeast Missouri. This sample in conjunction with the other two phases was used to obtain an estimate of total mortality in the area that was surveyed. One hundred and thirty-five stereo triplet photographs were taken on July 7-10, 1970, at intervals of 11.2 miles on nine east-west flight lines an average distance of ten miles apart (Fig. 1). A scale of 1:4000 was used with Ektachrome MS 2448 film, 9" x 9" format. Each photo plot contained about 200 acres. Interpretation methods were the same used on the observation plots. Of the 135 photo plots, 45 (one-third) were randomly selected for ground checking suspect trees. The ground checks were carried out within ten days of the photography. The photo sampling area is 15,000 square miles, and was selected because it contains the greatest concentration of Missouri's oak type and the State's highest known oak wilt incidence.

RESULTS AND DISCUSSION

Visual Surveys of Observation Plots - In the ten plots, 24% of the oak wilt infected trees were found during the week of July 7-11 (Table 1). The peak period of oak wilt infections in terms of visibility from the air is estimated to be the first half of July.

Photography of Visual Observation Plots - In the four plots photographed, 17 oak wilt infected trees were found (Table 2). During the same week 19 trees were found by the visual survey in the same plots.

Aerial Photographic Sampling Survey - In the 45 photo plots that were randomly selected for ground checking of suspect trees, three oak wilt infected trees were found. Analysis of data by the method used by Hanson and Lautz (1969) gives an oak wilt mortality estimate of 0.07 $\pm$ 0.07 2/ tree per plot or 0.23 $\pm$ 0.23 tree per square mile.

2/ 90% confidence interval

Table 1. Number of oak wilt infected trees found by visual surveys of observation plots.

	Plot No.											
Date	1	2	3	4	5	6	7	8	9	10	Total	Per Cent
6/23-27	4	7	0	0	0	1	0	0	0	0	12	12
7/7-11	7	9	2	1	0	0	1	0	2	1	23	24
7/20-24	13	6	12	5	1	0	0	1	0	3	41	43
8/3-7	4	1	12	1	1	0	1	0	0	0	20	21
Total	28	23	26	7	2	1	2	1	2	4	96	-

Table 2. Comparison of visual and photographic surveys July 7-11.

Number of oak wilt trees

	Plot No.				
Method	1	2	3	4	Total
Photo	4	7	5	1	17
Visual	7	9	2	1	19

In the observation plots, approximately four times as many oak wilt infected trees were found during the entire season as were found the week of July 7-11. Applying this ratio to the photographic sampling survey, the total oak wilt incidence for the season is obtained by multiplying the confirmed oak wilt trees by four. Since 0.23 tree per square mile was found by the photo sampling method, the seasonal total would be 0.92.

Although oak wilt has been reported in Missouri for at least 20 years, incidence of oak wilt as shown by the survey is very low and constitutes no threat to the oak forests there for this year or for several years. In the 45 photo plots, three lightning strikes were found on ground checking. Oak wilt at this time, therefore, is no more serious a problem than lightning even though there has been no control program.

REFERENCES

Bretz, T. W. 1951. Oak Wilt. Jour. For. 49 : 169-171.

Hanson, J. B. and W. Lautz. 1969. Survey of Annosus Root Rot-caused Mortality in Thinned Shortleaf Pine Plantations, Shawnee National Forest, 1968. USDA-FS, Delaware Insect and Disease Field Office, Delaware, Ohio. Report D-2-69.